REMARKS

A new Supplemental Declaration of inventor Yanik is submitted herewith, which identifies the citizenship of the one inventor, which information is missing from the previously submitted declaration.

The specification has been amended as suggested by the Examiner.

Claims 1-4 and 23 are rejected under 35 USC 103(a) over U.S. Patent 6,870,624 to Hobbs et al. ("Hobbs"). The rejection is respectfully traversed.

Hobbs discloses a surface relief structure for sensing chemical and biological materials, such as pollutants, DNA or proteins. The structure is designed to have a narrow band reflection peak. When pollutants, DNA or proteins are present on the surface of the structure, surface resonance phenomena cause the reflection peak of the light resonated from the structure surface to shift in wavelength, thereby detecting the pollutants, DNA or proteins. See column 1, lines 40-58. Hence, in order to increase the sensitivity of detection, it is desirable for reflection peak of the light resonated from the structure to be as narrow as possible. Otherwise, the sensor is less sensitive to a shift in wavelength of the peak caused by the pollutants, DNA or proteins. The need for narrow reflection peaks is noted by Hobbs in column 2, lines 1-13.

The reflection peaks of the surface relief structures disclosed by Hobbs are consistent with the above requirements. Thus, the peaks in Figs. 6 and 9 all appear to be very narrow in width, especially if the peak is defined to occur only where there is near complete reflection. As noted by Hobbs in column 7, lines 45-47, light at wavelengths above 800 nm or below 775 nm are completely transmitted and not reflected. Even if 5 nm is assumed to be the width of the reflection peak (so that the peak is defined as the range of wavelengths over which there is any reflection of light at all), this would yield a ratio (5/777.5) of less than 1% of the resonance wavelength. The actual width of the reflection peak (defined to the range of wavelengths over which there is near complete reflection) of Hobbs's structure is much narrower than 5/777.5. It appears from Figs. 6 and 9 that there is significant transmission and much less reflection of light at wavelengths within the 775 to 800 nm wavelength range, and near 100% reflection occurs only over a very small portion of the wavelengths from 775 to 800 nm. This is as expected, since as noted above, it is desirable for the structure of Hobbs to have as narrow a reflection peak as possible for enhanced sensitivity. Whether or not Figs. 6 and 9 of Hobbs can be assumed to be drawn to scale and therefore interpreted as stated above, Hobbs has simply failed to disclose or suggest a structure such that electromagnetic radiation incident upon it is substantially completely reflected over a range of frequencies, where such range is greater than about 1% of the resonance frequency. If anything, Hobbs teaches away from such structure, since it is desirable for the surface relief structures of Hobbs to have as narrow a reflection peak as possible.

The goal sought to be achieved in claims 1 and 23 is to create large bandwidth reflection, that is, substantially complete reflection over a wavelength range of greater than about 1% of the resonance wavelength. The creation of the large bandwidth reflection is a non-trivial and non-obvious matter, and has never been recognized before in spite of perhaps more than 50 years of research in dielectric grating. During this long period, a reflection peak with such a narrow lineshape such as Hobbs is in fact routinely produced, but no one was able to produce anything that was as wide as what is claimed herein.

For the reasons above, we believe that claims 1 and 23 are non-obvious and patentable over Hobbs and all other art of record.

Claims 2 and 23 also contain the limitation of the diameter of the air holes being at least 0.2a, where a is the period of the air hole array. This further distinguishes over Hobbs. As explained in Paragraph [0063] and illustrated in Figs. 8(b) and 8(c), this choice of the hole dimensions is one factor that allows the wide reflection peak to be achieved. This is not something that can be found by routine experimentation, contrary to the opinion of the Examiner, and the Examiner has provided no support for his conclusion that it can be.

The Examiner stated that the motivation for choosing hole size of 0.2a is to "filter various wavelengths," relying on column 3, lines 30-35 of Hobbs. This is taken to mean that one skilled in the art would want to vary the wavelength of light that is filtered. This reasoning for rejecting claim 2 is believed to be incorrect. Hobbs did not give any guidance as to how the width of reflection peak can be chosen or widened, an issue on which Hobbs is totally silent. Column 3, lines 30-35 of Hobbs contain no teaching about this feature so that the Examiner's reliance thereon is misplaced. Hobbs is interested only in choosing his parameters to shift the peak wavelength to a different wavelength value, and did not give any guidance as to how the reflection peak can broadened. The statement "All of these parameters can very depending on the application" in column 9, lines 30-31 refers only to varying the parameters for shifting the peak wavelength to a different value, and not for choosing the width of or widening the reflection peak. Given the totally different reasons above for choosing parameters (widening the peak versus shifting the peak), one skilled in the art would not be able to choose the hole size of about 0.2a for achieving a wide reflection peak in view of Hobbs.

Thus the rejection of claims 2 and 23 is without foundation and should be withdrawn. Claim 2 is also believed to be allowable since it depends from claim 1. Claim 23 is also believed to be allowable on the grounds explained above for claim 1.

Claims 3 and 4 are believed to be allowable since they depend from claim 1.

CONCLUSION

In view of the amendments and remarks contained herein, it is believed that all claims are in condition for allowance and an indication of their allowance is requested. However, if the Examiner is aware of any additional matters that should be discussed, a call to the undersigned attorney at (415) 318-1160 would be appreciated.

Respectfully submitted,

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